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B3B BMS1
U1S S1695 S1723 S2123 S2139 S2204

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GB 2211447 A GB 2176138 A GB 1582470 A
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(58) Field of Search
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INT CL[5] B23B
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(54) Adaptors for a drill stand

(57) An adaptor for mounting a drill stand 11 on an I-beam 37 comprises a base plate 5 which is clamped to a flange 41 of the beam. A table 13 of the drill stand is then bolted to cross-members 3 slidably mounted on the base plate 5.

In another arrangement, the pillar 15 of the drill stand 11 is fitted in a collar housing 85 which is slidably mounted on a base plate 5' (Figure 4, not shown).

In yet another arrangement, a pillar 15 of a drill stand is mounted on a flange 41 of an I-beam by opposed jaws 68, 71 which are slidable along the pillar and locked in position by screws 73, 75 (Figure 5, not shown).

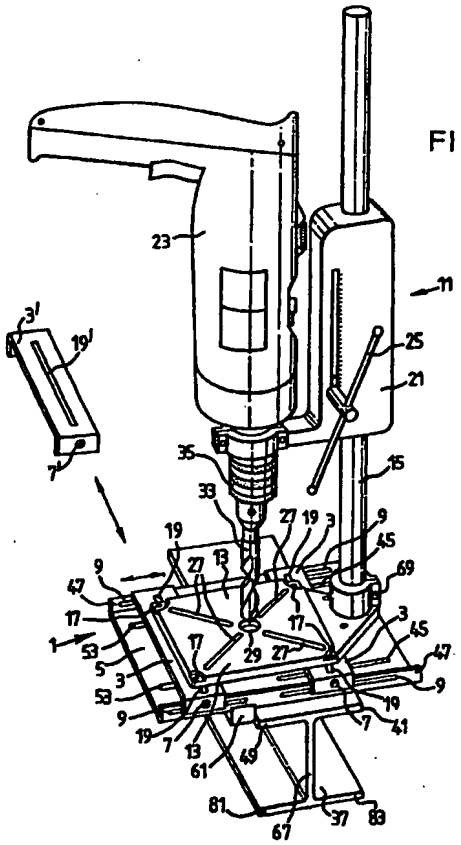

FIG.1

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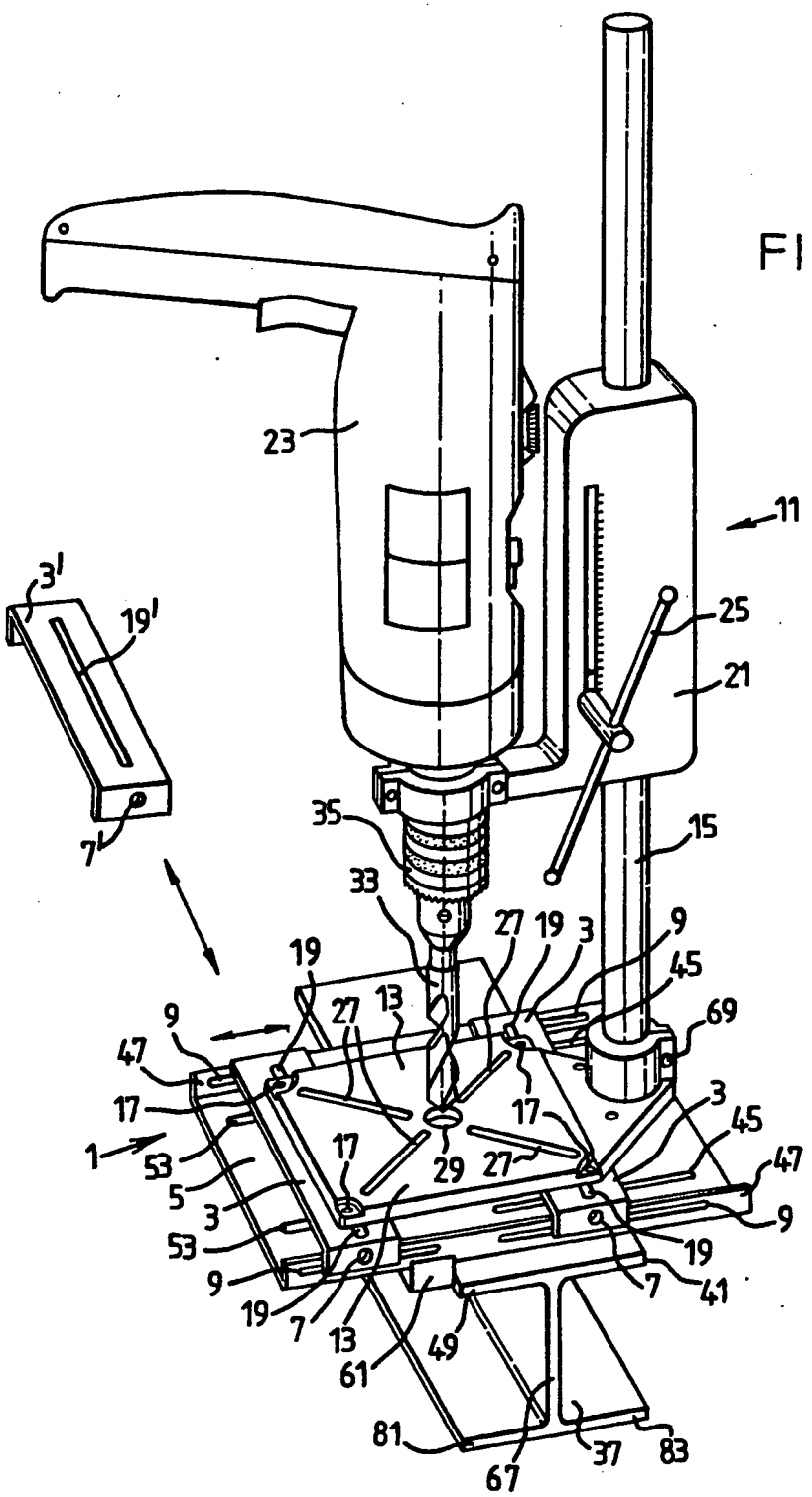
At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.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11
3'
19'
25
21
7'
35
15
33
27
19
3
9
45
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13
27
69
9
47
17
17
3
45
1
53
17
29
27
47
5
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9
9
19
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41
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13
49
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81
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83
67

FIG.1

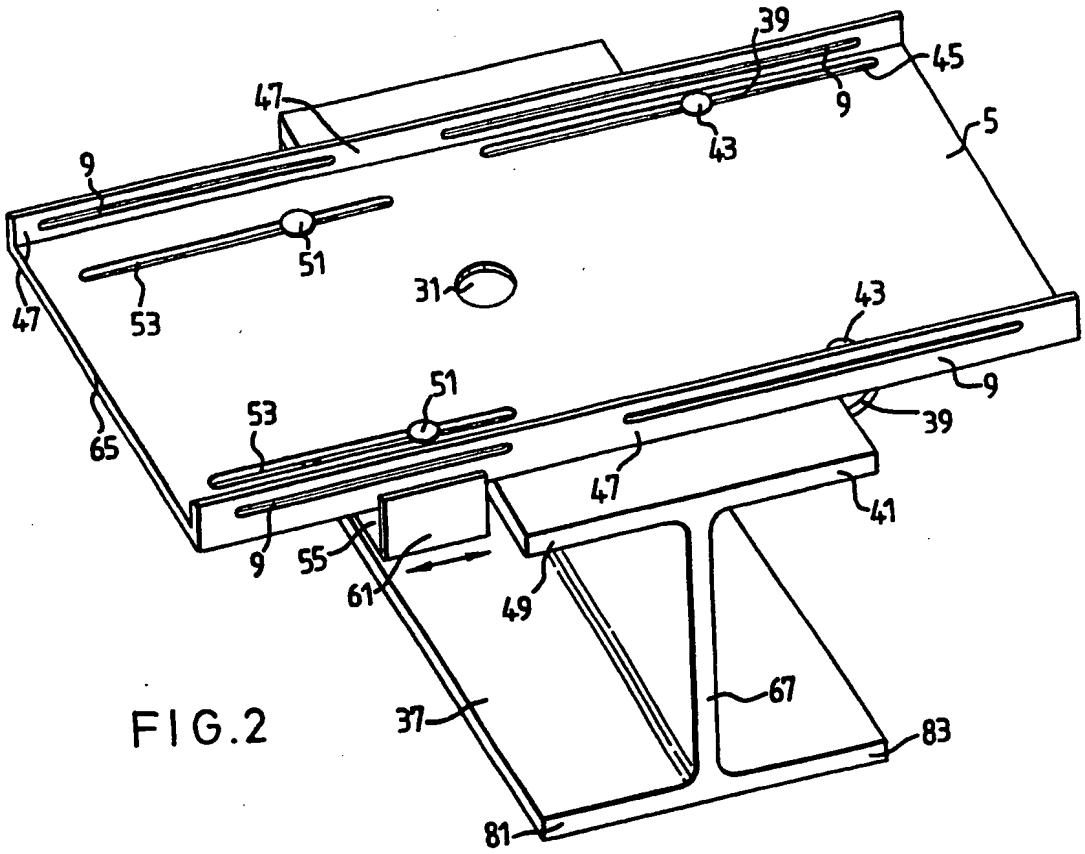
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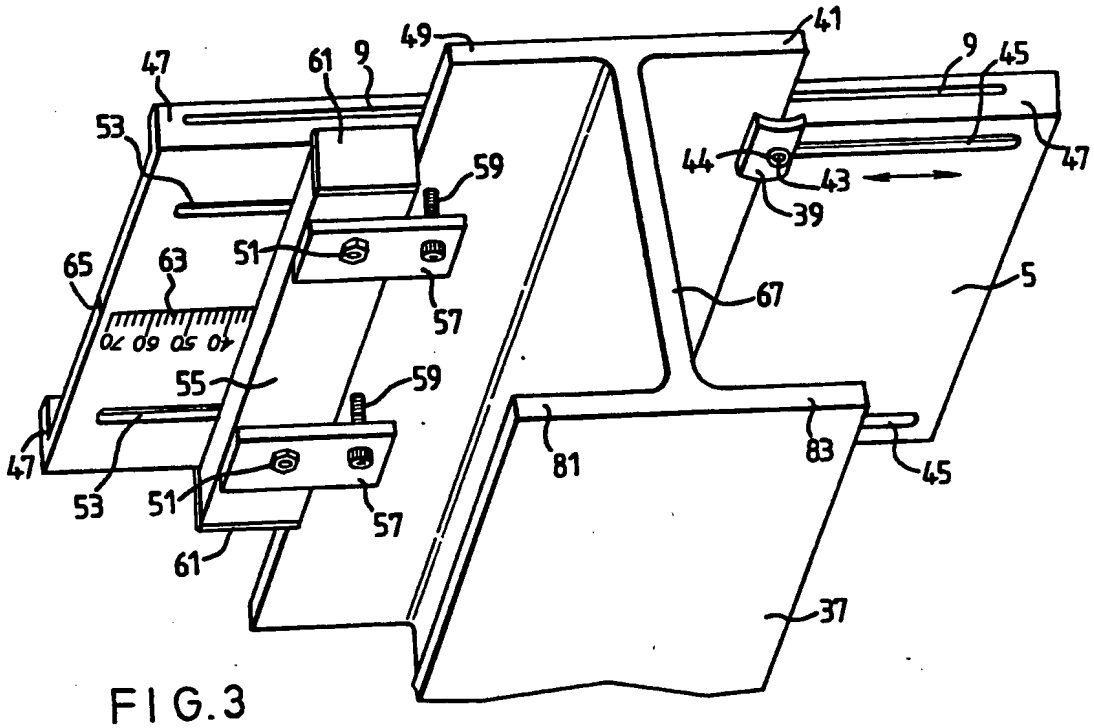
FIG.2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39
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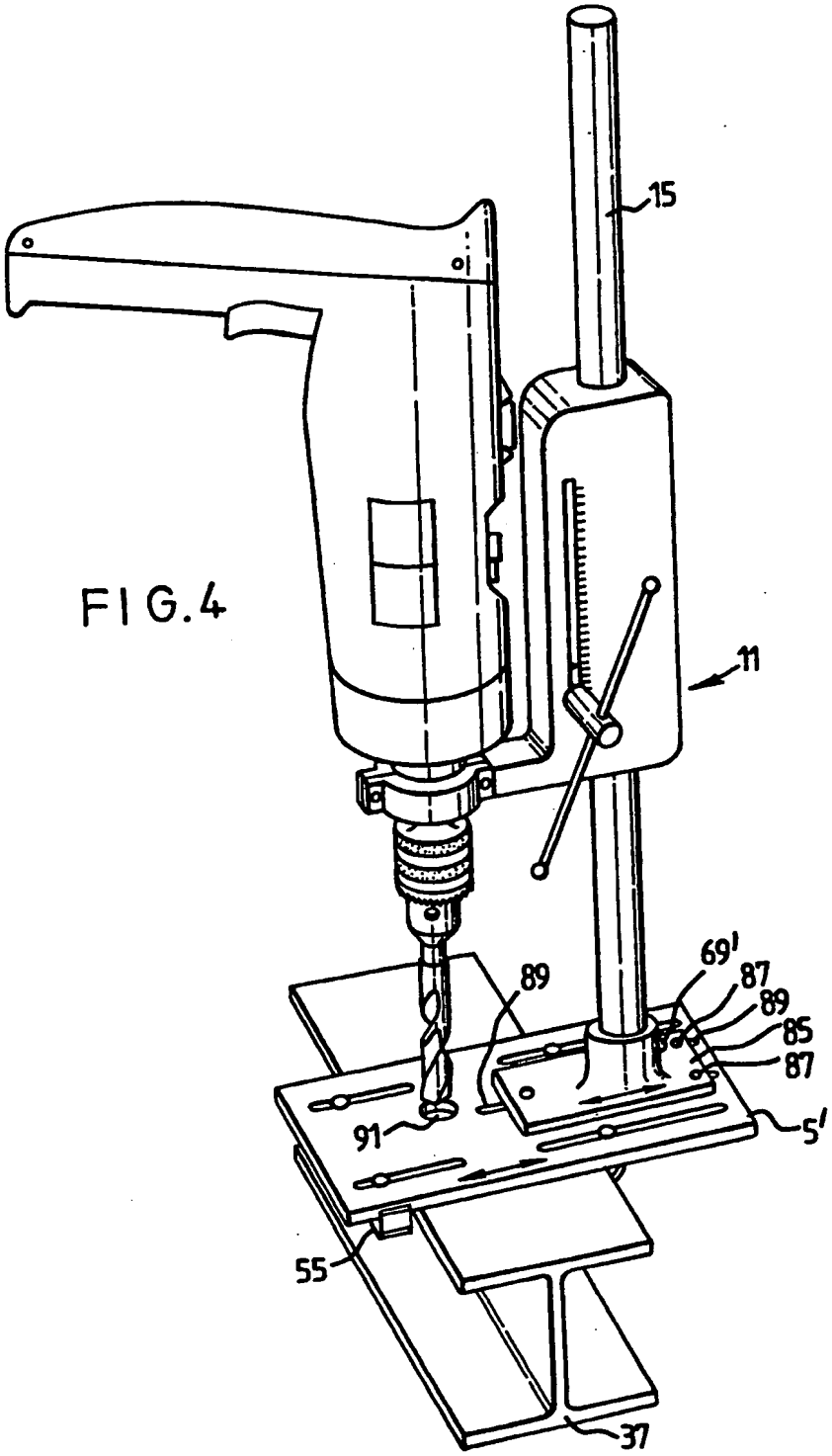
37

FIG.3

FIG.4



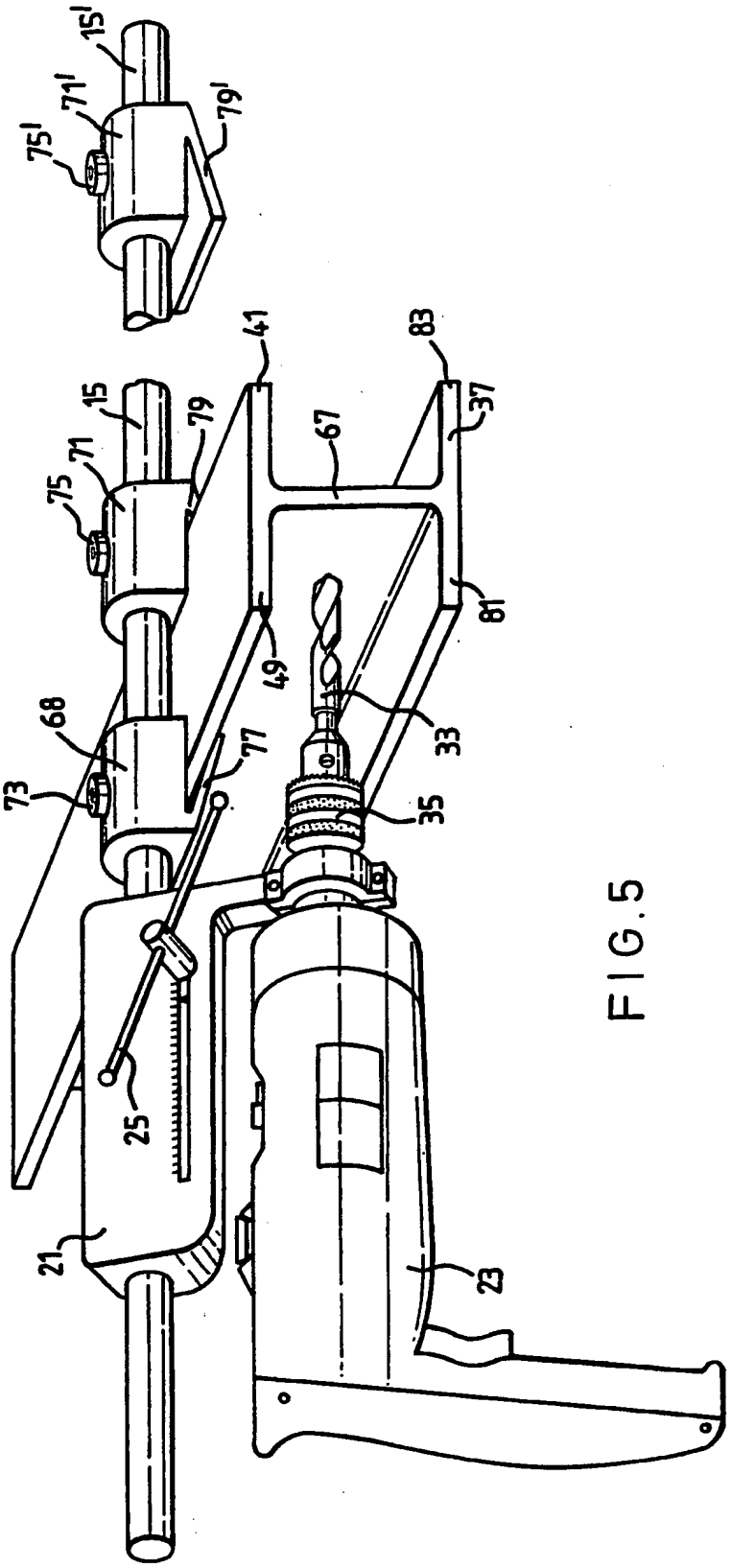


FIG.5

HORIZONTAL AND VERTICAL ADAPTORS FOR A DRILL STAND

The present invention relates to adaptors for a drill stand and to a drill stand incorporating the adaptors.

A particular feature of my invention is that a drill stand can be physically clamped to a metal or plastic joist, beam or column of various dimensions and to enable multiple holes to be drilled through the central web at pre-set distances from the face of the flange, or through the flange at pre-set distances from the edge of the flange, without the need of an electro magnetic device to hold the drill stand in position. The advantages of my method of drilling multiple holes in the horizontal or vertical plane are: -

holes can be drilled through non-magnetic materials such as stainless steel and the new experimental "super plastic" structures that are at present being erected in Scotland;

holes can be drilled in sensitive surroundings such as radar installations, computer factories etc where electro-magnetic or magnetic apparatus is not acceptable;

uneven surfaces sometimes found on metal have no detrimental effect on my clamping method, whereas it may cause difficulty with a magnetic drill stand;

no safety chain is required with my clamping method, as is required with magnetic drill stands; and

with my clamping method the drill stand would not become detached in the event of a power failure, as would be the case with a magnetic drill stand.

My invention enables multiple holes to be drilled at pre-set positions relative to the edges of flanges of metal or plastic joists beams or columns or through the central web at pre-determined distances from the face of the flange, whereas a magnetic drill stand has to be positioned for each and every hole, individually.

The present invention provides a method of clamping a drill stand to metal or plastic joists, beams or columns in such a way that the drill stand can operate in the horizontal or vertical plane, or even upside down, when holes can be drilled in overhead applications. It can also be used as a portable drill stand for on-site work by being clamped to any convenient joist, beam or column.

To enable the drill stand to operate in the vertical plane, an adaptor in the form of a base-plate is attached to a metal or plastic joist, beam or column, and a means of attaching a drill stand to the base-plate is provided. The drill stand can be adjustably mounted on the base-plate for movement relative to the base-plate while being lockable in a required position.

Preferably the means for attaching the base-plate

to the joist, beam or column is partially releasable to allow the adaptor to slide along the joist, beam or column. This is particularly useful when drilling a number of holes in line at intervals.

Preferably the drill stand is of standard type, comprising a table and a pillar extending upward from the table. An electric drill is attached by a clamp to a bracket that slides about the pillar towards and away from the table.

To enable the drill stand to operate in the horizontal plane, the table is withdrawn from the pillar by loosening the bolt or screw. Two adaptors with angled fingers are fitted onto the end of the pillar with the fingers facing inwards towards each other, and when in the correct position with the tapered part of each finger enclosing each flange of the joist, beam or column, the screws are then tightened, thus holding the drill stand securely in position and ready for drilling to commence.

Other preferred features of the invention are shown in the following description.

The invention will be further described by way of example with reference to the accompanying drawings, in which: -

Figure 1 is a perspective view of an adaptor forming one embodiment of the invention, shown in use for mounting a drill stand and drilling machine on a metal

or plastic joist beam or column;

Figure 2 is a view from above of one adaptor of figure 1 mounted upon a joist beam or column with the two supporting cross members removed for clarity;

Figure 3 is an underneath view of the adaptor shown in Figure 2;

Figure 4 is a perspective view of two adaptors forming another embodiment of the invention, shown in use for mounting a drill stand and drilling machine on a metal or plastic joist, beam or column, after the table has been removed from the drill stand; and

Figure 5 shows yet another adaptor forming an embodiment of the invention.

Figure 1 shows an adaptor 1 forming one embodiment of the invention. The adaptor comprises two support cross-members 3, of which one is shown separated at 3′ for clarity. These support cross-members 3 are attached to the adaptor base-plate 5 by bolts (not shown) through holes 7 and slots 9. One hole 7 is shown as 7′ in the separated view. Two of the holes 7 at the reverse end of support cross-members 3 are obscured by other parts of the drawing. A standard-type drill stand 11, comprising a table 13 and an upright pillar 15 is mounted on the two support cross-members 3 and attached by bolts, (not shown) through holes 17 in table 13 and slots 19. The pillar 15 carries a slide 21 which supports an electric drill 23 for movement of the

electric drill 23 relative to the table 13 upon the action of the handle 25, as it well known. One slot 19 is shown separated at 19' for clarity. Alternatively, the table 13 of the drill stand 11 could be attached to the support cross-members 3 by means of bolts (not shown) through slots 27 if preferred.

Chuck 35 is positioned coaxially with hole 31 in base-plate 5 by inserting a drill 33 or short rod held in the drill-chuck 35 through holes 29 in table 13. The drill 33 (or rod, not shown), is then passed through a drilling bush (not shown), that has the same size hole as the diameter of the drill 33 and the outside diameter being the same size as the hole 31 in the base-plate 5 (figure 2). The bolts (not shown) in slots 9 and 19 are then tightened to ensure that chuck 35 is concentric with hole 31 in base-plate 5. Drilling bushes that fit into base-plate 5 are used as a means of ensuring that always drill 33 is maintained in a precise position for accurate drilling. Slots 9 in side flanges 47 of base-plate 5, and slots 19 in support cross-members 3 ensure that the drill stand 11 can be adjusted in any direction to ensure that hole 29 in table 13 can be positioned accurately in line with hole 31 in base-plate 5, irrespective of the size of the table 13 or the position of bolt holes 17 or slots 27 in table 13.

Figures 2 and 3 show the arrangement for bolting the base-plate 5 to the joist, beam or column 37 in the

following manner:

A first pair of curved clamp plates 39 grip the underside of a flange 41 of the joist, beam or column 37 as the coach bolts 43 are tightened. The curved shape of the clamp plates 39 are so shaped to automatically adjust to the large variation in the thickness of the flanges 41 of many joists, beams and columns, as normal flat clamp plate (not shown) will only clamp successfully over thicknesses of materials for which they have been specifically designed. Slots 45, through which coach bolts 43 slide, allow for a great variation in the width of joists, beams or columns 37. One slot 45 in figure 2 is obliterated by the side flange 47 in base-plate 5. The clamping arrangement for gripping upon the flange 49 is a different arrangement. Coach bolts 51 are passed through slots 53, sliding bar 55, and finger plates 57. These figure plates 57 could be welded to sliding bar 55 to maintain the right-angled position relative to the sliding bar 55. The thickness of the sliding bar 55 is little more than the maximum thickness of any flange 49 of any joist, beam or column 37 to which it is intended that the base-plate 5 shall be clamped. Cap screws 59 are fitted through holes (not shown) in finger plates 57. These holes (not shown,) are threaded to allow the cap screws 59 to be adjusted to bear upon the underside of any thickness of flange 49 to which it is intended that the base-plate 5 shall be

clamped. Thin end plates 61 are welded to sliding bar 55 at each end and engage the edges of base-plate 5 to maintain the correct right-angled alignment with base-plate 5. One thin end plate 61 is obscured in figure 2 by other parts of the drawing. A graduated scale 63 at 1mm intervals is engraved upon the underside of base-plate 5. This scale 63 shows the distance from the face of the sliding bar 55 to the centre of the hole 31 in base-plate 5. A centre line indentation mark 65 is engraved on the end of base-plate 5 as an aid to calculating the lateral distance between any holes to be drilled.

In use, the required distance of the centre-line of any hole or number of holes required to be drilled, as measured from the edge of the flange 49, is noted and the sliding bar 55 is set to this figure and coach bolts 51 are then tightened. Cap screws 59 are adjusted to allow the base-plate 5 and the cap screws 59 to encompass flange 49 of the joist, beam or column 37. Curved clamp plates 39 are then slid along slots 45 after the coach bolts 43 have been slackened enough to allow the curved clamp plates 39 to engage upon the underside of flange 41. Coach bolts 43 are then tightened, followed by cap screws 59 being brought to bear upon the underside of flange 49 and tightened.

The drill stand 11 is then placed in position upon the support cross-members 3 and the support

cross-members 3 are in turn placed upon base-plate 5. The drill 33 is then lowered by means of pressure upon the handle 25, through the hole 29 in the table 13 into a drill bush (not shown) of the correct size, this bush being located in the hole 31 in base-plate 5.

With the drill 33 held in this lowered position and entered into the drill bush (not shown), the bolts, (not shown) in holes 7 of the support cross-members 3, and entered through slots 9 are tightened. Then bolts (not shown) through holes 17 or slots 27 of the table 13 and entered through slots 19 in the support cross-members 3 are tightened, thus ensuring that the hole 29 in table 13 is concentric with hole 31 in base-plate 5. If any particular table has no hole 29 then a hole 29 will have to be drilled to achieve this degree of concentricity. This method will ensure that the sliding bar 55 when set to a reading on the scale 63 will always be true. Once set, any number of holes can be drilled along the joist, beam or column 37, into flange 49 in a lateral direction, by slackening the coach bolts 43 which hold the curved clamp plates 39 against the underside of flange 41, followed by slackening the cap screws 59 in finger plates 57. The whole adaptor 1 can now be slid along the joist, beam or column 37 in a lateral direction to the position required to drill the next hole, after re-tightening cap screws 59 and coach bolts 43, taking care to hold the sliding bar 55 against the

edge of flange 49 whilst so doing. If further holes are required in another joist, beam or column 37, even one of different dimensions but with the holes to be drilled at the same distance from the edge of the flange 49, then cap screws 59 and coach bolts 43 will have to be slackened to a greater degree to allow the whole adaptor 1 to be removed and re-sited. The setting will always remain to the position of further holes as long as coach bolts 51 holding sliding bar 55 in place are not slackened.

An alternative method of assembly is to position the drill stand 11 in position as described above, and secured to support cross-members 3 and base-plate 5, followed by positioning the sliding bar 55 in the chosen position for drilling, before placing about the joist, beam or column 37.

Another embodiment of the invention is to use the adaptor 1 as a portable drill stand 11 by clamping the adaptor 1 to any convenient joist, beam or column 37 and using the drill stand 11 in a conventional manner. The drill stand 11 can be released from the adaptor 1 by unscrewing the bolts (not shown) through holes 17 or slots 27 in table 13 and then rebolted onto a work-bench and used in the conventionable manner.

Another embodiment of the invention is shown in Figure 4. The pillar-housing bolt 69 is slackened and the drill-stand pillar 15 is removed from the

drill-stand table 13 clamped in an adjustable collar housing 85 which is in turn attached to a modified base-plate 5′ by bolts 87 that can slide within slots 89 to allow the collar housing 85 to be adjusted along the base plate 5′. This modified base-plate 5′ is narrower and thus lighter than that of the embodiment of Figures 1 to 3 and does not require the slotted flanges 9 and 47, or the cross-members 3. With this modification it is not necessary to remove the drill-stand table 13 from the bench to which it is normally bolted, which saves time and trouble to the operator and also reduces the weight by a further considerable amount. Once the collar housing 85 has been set to the correct position to match the hole 91 in the base plate 5′, the housing 85 will not need to be adjusted until or unless a different drill-stand 11 is to be used. When it is to be used on overhead work, the sliding bar 55 (see also figure 2) can be set to the required calibration to suit the required position of the hole or holes to be drilled, and the base-plate 5′ can be clamped onto the RSJ, Beam or Column 37, followed by the assembly of the drill-stand pillar 15 into the adjustable collar housing 85 and the tightening of the pillar housing bolt 69′. Split bushes (not shown) can be fitted into the collar of the housing 85 to suit the different diameters of the pillars of various models or drill-stand.

Another embodiment of the invention is to use it for

drilling holes in the horizontal plane through the web 67 of joists, beams or columns 37 as will now be described, referring to figure 5.

After releasing the bolt 69, (figure 1) at the bottom of the pillar 15, (figure 1) the table 13 will become disconnected from the pillar 15, (figure 1) but on some drill stands 11 a large grub screw (not shown) is used in place of the bolt 69 to attach the table 13 to the pillar 15.

Two horizontal adaptors 68 and 71 are placed in position onto pillar 15 with the angled fingers 77 and 79 facing inwards towards each other. In the interest of clarity one adaptor is shown separated at 15', 71', 75', and 79'. The adaptors 68 and 71 are placed in position, enclosing flanges 41 and 49 with the angled fingers 77 and 79, and held firmly as the cap screws 73 and 75 are tightened. Most drill stands 11 have an attachment or cap screw (not shown) to allow the sliding part 21 of the drill stand 11 to rotate around the pillar 15. By slackening this cap screw or attachment the position of the drill 33 can be adjusted to any position within the limitations of the arc (not shown) of any particular drill stand. Some drill stands 11 do not have this facility to rotate the sliding part 21 around the pillar 15, but the same result can be achieved by slightly loosening the cap screws 73 and 75, and re-tightening when the drill 33 is in the desired

position. Using this method the drill 33 can be positioned very close to a wall or other obstruction, if desired.

In use the pressure brought to bear upon the web 67 by the use of the handle 25 will cause a reverse direction of pressure resulting in the angled fingers 79 being drawn very tightly against flange 41, thus making a safety chain unnecesssary.

A split bush (not shown) could be fitted inside adaptors 69 and 71, to prevent bruising of pillar 15 when cap screws 73 and 75 are tightened. Bushes (not shown) could be of various sizes to accommodate different diameters of pillars 15, according to the particular model of drill stand 11 being used.

On very heavy industrial use, a long bolt (not shown) could be fitted to adaptors 69 and 71 with a threaded part on adaptor 69 so that the two adaptors could be draw together in the manner of the action of a vice.

Another embodiment of the invention for either drilling the web 67 in the horizontal plane, or for drilling flanges 81 or 83 in the vertical plane, is by reversing either adaptor by clamping onto flanges 81 and 83 in the upside down position, of particular interest for over head situations.

CLAIMS: -

1. An adaptor for a drill stand, the drill stand comprising a pillar and a slide mounted on the pillar for carrying a drill, the adaptor comprising a platform, means for attaching the platform to a support such as a beam, joist or column, and means for mounting the drill stand on the platform.

2. An adaptor as claimed in claim 1, wherein the mounting means comprises a pair of opposed jaws for gripping opposite edges of the flange of an I-beam or the like.

3. An adaptor as claimed in claim 1 or 2, wherein the mounting means is adapted to grip an edge of a flange, and markings are provided to position a drill receiving aperture in the platform at a predetermined distance from the flange edge.

4. An adaptor as claimed in claim 1, 2 or 3, wherein the mounting means is partially releasable to allow the platform to be slid along the support.

5. An adaptor as claimed in any one of claims 1 to 4, wherein the drill stand includes a table in which the pillar is mounted, the table being mounted on the

platform.

6. An adaptor as claimed in any one of claims 1 to 4, wherein the means for mounting the drill stand on the platform comprises a collar which receives the pillar of the drill stand.

7. A mount for mounting a drill on a joist, beam or column, comprising a pillar, a carriage mounted on the pillar and adapted to carry a drill for movement along the pillar under the action of a lever, and means for clamping the pillar to the joist beam or column.

8. A mount as claimed in claim 5, wherein the clamping means comprises a pair of opposed jaws which are slidable relative to one another along the pillar to grip opposite edges of a flange of an I-beam, and means for locking the jaws in position relative to one another.

Patents Act 1977
Examiner's report to the Comptroller under Section 17
(The Search report) -15-

Application number
GB 9326581

Relevant Technical Fields

(i) UK Cl (Ed.M) B3B (BMS1, BMS4, BMS6), B3C

(ii) Int Cl (Ed.5) B23B

Search Examiner
V L C PHILLIPS

Date of completion of Search
12 MAY 1994

Databases (see below)
(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

(ii) ONLINE DATABASES: WPI, CLAIMS

Documents considered relevant following a search in respect of Claims :-

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages		Relevant to claim(s)
X	GB 2211447 A	(ROTABROACH) see Figure 1	1 and 7 at least
X	GB 2176138 A	(COLLIS) see Figure 1	1 and 7 at least
X	GB 1582470 A	(HOUGEN) see Figure 1	1 and 7 at least
X	GB 1029930 A	(SINGER) see Figure 1	1 and 7 at least

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).